

# Restriction on Covert Movement\*

## *Evidence from Comparative Ellipsis in Japanese*

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### 1. Introduction

Reinhart (1976), in harmony with Chomsky (1957:100-101), maintains that the surface string in (1) can give rise to the wide scope reading of  $QP_{Sub}$  over  $QP_{Obj}$  (= the surface scope), but not the wide scope reading of  $QP_{Obj}$  over  $QP_{Sub}$  (= the inverse scope).

- (1)  $QP_{Sub}$  Verb  $QP_{Obj}$ .  
( $QP_{Sub}$  stands for a subject QP, and  $QP_{Obj}$  an object QP.)

Huang (1982:220) argues that his intuition is correct in Chinese, and formulates his intuition as in (2), adopting covert movement postulated in May

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1977. Hoji (1985:Ch.4) demonstrates, in effect, that (2) holds also in Japanese.

(2) Isomorphism Principle

When two noun phrases,  $\alpha$  and  $\beta$ , undergo covert movement, their c-command relation prior to the movement cannot be altered.

May (1977), however, assumes that (1) can give rise to both surface and inverse scope, and takes that as evidence that (1) can be represented at LF either as (3a) or as (3b), where the compositional computation applied to (3a) generates the surface scope and that applied to (3b) the inverse scope.

(3) a. LF: [QP<sub>Sub</sub> [QP<sub>Obj</sub> [t<sub>Sub</sub> [Verb t<sub>Obj</sub>]]]]

b. LF: [QP<sub>Obj</sub> [QP<sub>Sub</sub> [t<sub>Sub</sub> [Verb t<sub>Obj</sub>]]]]

It has also been reported that Japanese allows the inverse scope (e.g., Kitagawa 1990, Kuno et al. 1999, Hayashishita 1999, 2000ab, 2003). Furthermore, the inverse scope seems not impossible even in Chinese as far as embedded contexts are considered, according to my informants. To the extent that May's analysis of the inverse scope is maintained, therefore, (2) must be rejected not only in English, but also in Japanese and Chinese.

In Hayashishita (1999), (2000ab), and (2003), it is argued, however, that while the surface scope can be generated directly from the grammar, the inverse scope cannot. In particular, it is explicitly argued in Hayashishita (2003) that the inverse scope is not generated on the basis of (3b), making it possible to maintain (2).

This paper provides independent evidence in support of (2). In particular, I demonstrate that (2) holds also between a QP and a *non-quantificational phrase* (= NP).

For the relevant demonstration, it is necessary to identify an environment in which (i) an NP is forced to undergo covert movement, and (ii) the c-command relation between the NP and a QP after covert movement can be examined. I will thus first argue in section 2 that the *comparative ellipsis construction* discussed in Hoji (1998) and (2002) serves as one such environment. In section 3, I will claim that, only if (2) is assumed, certain generalizations regarding this construction follow directly from its inherent properties. In section 4, I will conclude with a brief remark about the nature of the isomorphism principle.

## 2. Experimental Design

In this section, I will introduce an environment that allows us to demonstrate that the isomorphism principle in (2) holds between a QP and an NP, i.e., an environment where (i) an NP is forced to undergo covert movement, and (ii) the c-command relation between the NP and a QP after covert movement can be examined.

First consider (4).

- (4) [IP [AdvP [CP John-ni yorimo] sakini] [IP Kimura kyoozyu-ga  
John-DAT than early Kimura professor-NOM  
Bill-ni Mary-o syookaisita]] (to siyoo).  
Bill-DAT Mary-ACC introduced that suppose  
'(Suppose that) [IP [IP Prof Kimura introduced Mary to Bill]  
[AdvP earlier [CP than to John]]].'

(4) is understood to mean that Prof. Kimura introduced Mary to Bill earlier than he (= Prof. Kimura) introduced Mary to John, despite the fact that in the comparative clause, only *John-ni* is pronounced. Following Hoji (1998), I will refer to the comparative construction in (4) as the *comparative ellipsis construction* (= CE), where (i) what is pronounced in the comparative clause is only an NP that serves as the locus of comparison, and (ii) the NP is case-marked.<sup>1, 2</sup> For convenience, I will call the NPs that serve as the locus of comparison *locus NPs* (= <sup>L</sup>NPs), e.g., *John* and *Bill* in (4).

Hoji (1998, 2002) argues, on the basis of various kinds of bound anaphora, that the comparative clause of a CE is identical to its antecedent clause at LF, except for the locus NPs.<sup>3</sup> Once Hoji's claim is adopted, an

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<sup>1</sup> The first property distinguishes a CE from, for example, the construction in (i-a), where the comparative clause contains a predicate in addition to the locus NP, and the second property distinguishes it from the one in (i-b), where the comparative clause includes only the locus NP without a case-marker.

- (i) a. [IP [AdvP [CP *ec*<sub>1</sub> John-ni *ec*<sub>2</sub> syookaisuru yorimo] sakini] [IP Kimura kyoozyu<sub>1</sub>-ga  
John-DAT introduce than early Kimura professor-NOM  
Bill-ni Mary<sub>2</sub>-o syookaisita]] (to siyoo).  
Bill-DAT Mary-ACC introduced that suppose  
'(Lit.) (Suppose that) [IP [IP Prof Kimura<sub>1</sub> introduced Mary<sub>2</sub> to Bill] [AdvP earlier [CP  
than [IP *ec*<sub>1</sub> introduced *ec*<sub>2</sub> to John]]].'  
b. [IP [AdvP [CP John yorimo] sakini] [IP Kimura kyoozyu-ga Bill-ni Mary-o  
John than early Kimura professor-NOM Bill-DAT Mary-ACC  
syookaisita]] (to siyoo).  
introduced that suppose  
'(Suppose that) [IP [IP Prof Kimura introduced Mary to Bill] [AdvP earlier [CP than  
John]]].'

Following Hoji (1998, 2002), I assume that the constructions in (i) must be grammatically distinguished from a CE.

<sup>2</sup> The locus NPs in a CE must be dative-marked (or marginally accusative-marked). Accordingly, in all of the CE examples we will consider, the locus NPs are dative-marked.

<sup>3</sup> Hoji (2002:Sections 3.4, 4.2, and 5.2) demonstrates that when bound variable anaphora cannot be established between two elements in the antecedent clause, a sloppy identity reading cannot obtain in the comparative clause, and Hoji (1998:Section 3.3, p.143) shows that if bound variable anaphora obtains in the antecedent clause, then a sloppy identity reading is forced in the comparative clause.

LF copying or PF deletion analysis is called for. In this paper, I endorse his claim, and adopt the LF copying analysis, following Hoji (1998, 2002), without discussion.<sup>4</sup> In particular, I assume that (4), for example, is analyzed as illustrated in (5).<sup>5, 6</sup>

- (5) a. Before *to Bill* (the <sup>L</sup>NP of the antecedent clause) raises  
 [IP [AdvP [CP to John [C' [IP ec ] than]] early] [IP Prof. Kimura introduced Mary to Bill]]
- b. After *to Bill* (the <sup>L</sup>NP of the antecedent clause) raises  
 [IP [AdvP [CP to John [C' [IP ec ] than]] early] [IP to Bill<sub>i</sub> [IP Prof. Kimura introduced Mary t<sub>i</sub> ]]]

<sup>4</sup> The choice between LF copying and PF deletion does not affect any of the ensuing discussions.

<sup>5</sup> As far as the surface order is concerned, the AdvP of a CE can appear sentence-initially, as in (4), or between any of two major constituents of the antecedent clause, as in (i-a)-(i-c).

- (i) a. [IP [IP Kimura kyoozyu-ga [AdvP [CP John-ni yorimo] sakini] Bill-ni Mary-o  
 Kimura professor-NOM John-DAT than early Bill-DAT Mary-ACC  
 syookaisita]] (to siyoo).  
 introduced that suppose
- b. [IP [IP Kimura kyoozyu-ga Bill-ni [AdvP [CP John-ni yorimo] sakini] Mary-o  
 Kimura professor-NOM Bill-DAT John-DAT than early Mary-ACC  
 syookaisita]] (to siyoo).  
 introduced that suppose
- c. [IP [IP Kimura kyoozyu-ga Bill-ni Mary-o [AdvP [CP John-ni yorimo] sakini]  
 Kimura professor-NOM Bill-DAT Mary-ACC John-DAT than early  
 syookaisita]] (to siyoo).  
 introduced that suppose

However, all of the surface strings in (4), (ia), (ib), and (ic) must be represented at LF so that the AdvP is located sentence-initially, as in (5); otherwise, the infinite regress problem would ensue when the copying takes place, as pointed out by Watanabe (1993).

<sup>6</sup> An anonymous reviewer for NELS33 has pointed out that (i) below is also a conceivable analysis for (4), where the locus NP of the antecedent clause, Bill-ni 'to Bill' has raised to the IP that contains the AdvP. I wish to assume without discussion that (i) is ruled out by some parallelism principle that has to do with a theory of focus. Even if (i) turns out to be a possible analysis, the generalizations in section 3 will still suggest that a QP and an NP are subject to the isomorphism principle in (2) although some facts will remain unexplained.

- (i) a. Before the <sup>L</sup>NP of the antecedent clause raises  
 [IP [AdvP [CP to John [C' [IP ec ] than]] early] [IP Prof. Kimura introduced Mary to Bill]]
- b. After the <sup>L</sup>NP of the antecedent clause raises  
 [IP to Bill<sub>i</sub> [IP [AdvP [CP to John [C' [IP ec ] than]] early] [IP Prof. Kimura introduced Mary t<sub>i</sub> ]]]
- c. After LF copying takes place (= LF)  
 [IP to Bill<sub>i</sub> [IP [AdvP [CP to John<sub>i</sub> [C' [IP Prof. Kimura introduced Mary t<sub>i</sub> ] than]] early]  
 [IP Prof. Kimura introduced Mary t<sub>i</sub> ]]]

c. After LF copying takes place (= LF)

[<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> to John<sub>1</sub> [<sub>C</sub> [<sub>IP</sub> Prof. Kimura introduced Mary t<sub>1</sub>]]  
than]] early] [<sub>IP</sub> to Bill<sub>1</sub> [<sub>IP</sub> Prof. Kimura introduced Mary t<sub>1</sub> ]]]

(5) crucially assumes that the locus NP of the antecedent clause is moved out of the IP in which it originates even if it is not a QP, so as to avoid non-constituent copying.

What is of interest is that when a QP exists in the antecedent clause of a CE as a clause-mate of the locus NP, their c-command relation after covert movement corresponds to the c-command relation between the QP and the AdvP that contains the comparative clause.<sup>7</sup>

First, when a QP that is a major constituent of the antecedent clause c-commands the AdvP at LF (i.e., when the QP takes scope above the AdvP), the QP must also c-command its clause-mate locus NP at LF, whether or not the isomorphism principle holds between the two, as illustrated in (6).

- (6) a. [<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> <sup>L</sup>NP<sub>k'</sub> [<sub>C</sub> [<sub>IP</sub> ... t<sub>j</sub> ... t<sub>k'</sub> ...]] than]] early]  
[<sub>IP</sub> <sup>L</sup>NP<sub>k</sub> [<sub>IP</sub> ... t<sub>j</sub> ... t<sub>k</sub> ... ]]]]
- b. [<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> <sup>L</sup>NP<sub>k'</sub> [<sub>C</sub> [<sub>IP</sub> ... t<sub>k'</sub> ... t<sub>j</sub> ...]] than]] early]  
[<sub>IP</sub> <sup>L</sup>NP<sub>k</sub> [<sub>IP</sub> ... t<sub>k</sub> ... t<sub>j</sub> ... ]]]]

Second, when a QP that is a major constituent of the antecedent clause is c-commanded by the AdvP at LF (i.e., when the QP takes scope below the AdvP), the QP must also be c-commanded by its clause-mate locus NP at LF, irrespective of the isomorphism principle, as schematized in (7); otherwise, the QP-trace in the comparative clause (i.e., t<sub>j</sub>) could not be bound, as illustrated in (8).

- (7) a. [<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> <sup>L</sup>NP<sub>k'</sub> [<sub>C</sub> [<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> ... t<sub>j</sub> ... t<sub>k'</sub> ...]]] than]] early]  
[<sub>IP</sub> <sup>L</sup>NP<sub>k</sub> [<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> ... t<sub>j</sub> ... t<sub>k</sub> ... ]]]]
- b. [<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> <sup>L</sup>NP<sub>k'</sub> [<sub>C</sub> [<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> ... t<sub>k'</sub> ... t<sub>j</sub> ...]]] than]] early]  
[<sub>IP</sub> <sup>L</sup>NP<sub>k</sub> [<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> ... t<sub>k</sub> ... t<sub>j</sub> ... ]]]]
- (8) a. \* [<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> <sup>L</sup>NP<sub>k'</sub> [<sub>C</sub> [<sub>IP</sub> ... t<sub>j</sub> ... t<sub>k'</sub> ...]]] than]] early]  
[<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> <sup>L</sup>NP<sub>k</sub> [<sub>IP</sub> ... t<sub>j</sub> ... t<sub>k</sub> ... ]]]]
- b. \* [<sub>IP</sub> [<sub>AdvP</sub> [<sub>CP</sub> <sup>L</sup>NP<sub>k'</sub> [<sub>C</sub> [<sub>IP</sub> ... t<sub>k'</sub> ... t<sub>j</sub> ...]]] than]] early]  
[<sub>IP</sub> QP<sub>j</sub> [<sub>IP</sub> <sup>L</sup>NP<sub>k</sub> [<sub>IP</sub> ... t<sub>k</sub> ... t<sub>j</sub> ... ]]]]

In summary, I maintain that the generalizations in (9) hold in a CE.

<sup>7</sup> I assume that the AdvP in a CE is an existential quantifier over a degree variable plus its nuclear scope, cf. Larson (1988).

(9) Generalizations in a CE

Let  $\alpha$  be a QP that is a major constituent of the antecedent clause, and  $\beta$  its clause-mate locus NP.

- a.  $\alpha$  can take scope above the AdvP iff  $\alpha$  c-commands  $\beta$  at LF.
- b.  $\alpha$  can take scope below the AdvP iff  $\alpha$  is c-commanded by  $\beta$  at LF.

**3. Evidence for the Isomorphism Principle**

Let us evaluate the hypothesis that the isomorphism principle holds between an NP and a QP, using (9). If the movement of the locus NP of the antecedent clause and that of its clause-mate QP are subject to the isomorphism principle, we obtain (10), and from (9) and (10) the generalizations in (11) are derived.

(10) Let  $\alpha$  be a QP that is a major constituent of the antecedent clause, and  $\beta$  its clause-mate locus NP.

- a.  $\alpha$  c-commands  $\beta$  at LF iff  $\alpha$  c-commands  $\beta$  prior to covert movement.
- b.  $\alpha$  is c-commanded by  $\beta$  at LF iff  $\alpha$  is c-commanded by  $\beta$  prior to covert movement.

(11) Generalizations in a CE with the Isomorphism Principle

Let  $\alpha$  be a QP that is a major constituent of the antecedent clause, and  $\beta$  its clause-mate locus NP.

- a.  $\alpha$  can take scope above the AdvP iff  $\alpha$  c-commands  $\beta$  prior to covert movement.
- b.  $\alpha$  can take scope below the AdvP iff  $\alpha$  is c-commanded by  $\beta$  prior to covert movement.

If the isomorphism principle is irrelevant for the two elements under discussion, on the other hand, the generalizations in (12) should hold.

(12) Generalizations in a CE without the Isomorphism Principle

Let  $\alpha$  be a QP that is a major constituent of the antecedent clause, and  $\beta$  its clause-mate locus NP.

- a.  $\alpha$  can take scope above the AdvP, whether or not  $\alpha$  c-commands  $\beta$  prior to covert movement.
- b.  $\alpha$  can take scope below the AdvP, whether or not  $\alpha$  is c-commanded by  $\beta$  prior to covert movement.

The following empirical facts indicate that (11) can be maintained, while (12) cannot.

First consider (13).

- (13) [IP [AdvP [CP John-ni yorimo] sakini] [IP [QPsanninizyoo-no  
John-DAT than early three.more-GEN  
sensei]-ga Mary-ni tikazuita]] (koto)  
teacher-NOM Mary-DAT approached that  
'(That) [IP [IP [QPthree or more teachers] approached Mary]  
[AdvP earlier [CP than John]]].'

(13) is a CE whose antecedent clause has the configuration of [QP-NOM [<sup>L</sup>NP-DAT Verb]]. Following Kuroda (1969/70), Hoji (1985), and Hayashi-shita (2000b), I assume that the QP in (13) asymmetrically c-commands its clause-mate locus NP prior to covert movement. A question is whether the QP can scope above or below the AdvP in (13), i.e., whether (13) can give rise to (14a) or (14b).

- (14) a. The QP>AdvP reading  
There are three or more *x*s, *x* is a teacher such that the time at which *x* has approached Mary precedes the time at which *x* has approached John.  
b. The AdvP>QP reading  
The time at which there are three or more *x*s, *x* is a teacher such that *x* has approached Mary precedes the time at which there are three or more *y*s, *y* is a teacher such that *y* has approached John.

There are three possibilities to consider: (13) can give rise to (i) only (14a), (ii) only (14b), or (iii) both (14a) and (14b).<sup>8</sup> The following situations differentiate among (i)-(iii).

- (15) There are six and only six teachers, A, B, C, D, E, and F.  
a. Situation 1  
A, B, C, and D have all approached Mary earlier than John.  
b. Situation 2  
A, B, C, and D have approached Mary earlier than C, D, E, and F have approached John.

In the case of (i), (13) should be true in (15a), but false in (15b), while in the cases of (ii) and (iii), it ought to be true in both situations. In other words, (13) can be true in both situations as long as it can be interpreted as (14b). The fact seems be that (13) can truthfully uttered in (15a), but not in (15b), indicating that (13) is interpreted as (14a), but not as (14b). Hence, I

<sup>8</sup> I assume without discussion that (13) ought to have at least one of the readings in (14).

conclude that the generalization in (11b) can be maintained, but not that in (12b).

Consider (16), which is a scrambled counterpart of (13), i.e., a CE whose antecedent clause has the configuration of [<sup>L</sup>NP-DAT [QP-NOM Verb]].

- (16) [IP [AdvP [CP John-ni yorimo] sakini] [IP Mary-ni [QPsanninzyoo-no  
John-DAT than early Mary-DAT three.more-GEN  
sensei]-ga tikazuita]] (koto).  
teacher-NOM approached that  
'(Lit.) (That) [IP [IP Mary, [QPthree or more teachers] approached]  
[AdvP earlier [CP than John]]].'

(16) contrasts with (13) in giving rise to (14b), i.e., (16) can be truthfully uttered in both (15a) and (15b). Under the assumption that the <sup>L</sup>NP of the antecedent clause in (16) can be considered as asymmetrically c-commanding the QP, prior to covert movement (cf., Hoji 1985, Saito 1992, and Ueyama 2002, among others), this contrast constitutes further confirmation for the generalization in (11b).

Now consider (17).

- (17) [IP [AdvP [CP John-ni yorimo] sakini] [IP Kimura kyoozyu-ga  
John-DAT than early Kimura professor-NOM  
Mary-ni [QP mittuizyoo-no kaisya]-o syookaisita]] ra, rei-no  
Mary-DAT three.more-GEN company-ACC introduced if the-GEN  
dansi gakuseira-ga hungaisuru.  
male students-NOM become.mad  
'(Lit.) If [IP [IP Prof. Kimura introduces to Mary [QPthree or more  
companies]] [AdvP earlier [CP than to John]]], the male students will be  
mad.'

(17) is a CE whose antecedent clause has the configuration of [NP-NOM [<sup>L</sup>NP-DAT [QP-ACC Verb]]]. Following Hoji (1985) and Hayashishita (2000b), I assume that the QP in (17) is asymmetrically c-commanded by its clause-mate locus NP, prior to covert movement. What concerns us here is whether the CE in (17) can give rise to (18a) or (18b).

(18) a. The QP>AdvP reading

There are three or more *x*s, *x* is a company such that the time at which Prof. Kimura has introduced *x* to Mary precedes the time at which Prof. Kimura has introduced *x* to John.

b. The AdvP>QP reading

The time at which there are three or more *x*s, *x* is a company such that Prof. Kimura has introduced *x* to Mary precedes the time at which there are three or more *y*s, *y* is a company such that Prof. Kimura has introduced *y* to John.

As we did for the case above, let us consider three possibilities: the CE in (17) has (i) only (18a), (ii) only (18b), or (iii) both (18a) and (18b). The situations in (19) differentiate among (i)-(iii).

(19) There are six and only six companies, A, B, C, D, E, and F.

a. Situation 1

Prof. Kimura introduced A, B, C, and D to Mary earlier than he introduced them to John.

b. Situation 2

Prof. Kimura introduced A, B, C, and D to Mary earlier than he introduced C, D, E, and F to John.

In the cases of (i) and (iii), the male students need to get mad in (19a), but not in (19b), while in the case of (ii), the male students must get mad in both situations. In other words, if the CE in (17) can be construed as (18a), the male students need not to get mad in (19b). The fact seems to be that under whichever situation of (19a) and (19b), (17) can be truthfully uttered only if the male students get mad. I hence conclude that the CE in (17) can give rise to (18b), but not (18a), and the generalization in (11a) can be maintained while that in (12a) cannot.

The generalization in (11a) receives further confirmation from a scrambled counterpart of (17), i.e., a CE whose antecedent clause has the configuration of [NP-NOM [QP-ACC [<sup>L</sup>NP-DAT Verb]]]. It is in effect argued in Hoji (1985) and Kitagawa (1994), among others, that the QP in this configuration can be considered as asymmetrically c-commanding the <sup>L</sup>NP prior to covert movement. Given this, we predict that unlike (17), the scrambled counterpart gives rise to (18a). As illustrated in (20), this prediction is borne out, i.e., (20) can be truthfully uttered in the situation in (19b) even when the male students do not get mad.<sup>9</sup>

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<sup>9</sup> To argue for the generalization in (11a) over that in (12a), I have utilized a CE whose antecedent clause has the configuration of [NP-NOM [<sup>L</sup>NP-DAT [QP-ACC Verb]]]. Those who disagree with the assumption that the <sup>L</sup>NP in this configuration asymmetrically c-commands [continued over...]

- (20) [IP [AdvP [CP John-ni yorimo] sakini] [IP Kimura kyoozyu-ga  
John-DAT than early Kimura professor-NOM  
[QP mittiizyoo-no kaisya]-o Mary-ni syookaisita]] ra, rei-no  
three.more-GEN company-ACC Mary-DAT introduced if the-GEN  
dansi gakuseira-ga hungaisuru.  
male students-NOM become.mad  
'If [IP [IP Prof. Kimura introduced [QP three or more companies] to  
Mary] [AdvP earlier [CP than to John]]], the male students will be mad.'

We have thus confirmed that the generalizations in (11) hold in a CE, which are repeated here.

(11) Generalizations in a CE with the Isomorphism Principle

Let  $\alpha$  be a QP that is a major constituent of the antecedent clause, and  $\beta$  its clause-mate locus NP.

- a.  $\alpha$  can take scope above the AdvP, iff  $\alpha$  c-commands  $\beta$  prior to covert movement.
- b.  $\alpha$  can take scope below the AdvP, iff  $\alpha$  is c-commanded by  $\beta$  prior to covert movement.

Given that (11) is derived straightforwardly from the inherent properties of a CE (i.e. (9)), and the hypothesis that the isomorphism principle holds be-

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the QP (e.g., Kitagawa 1994 and Miyagawa 1997) may wish to consider (i) in place of (17).

- (i) [IP [AdvP [CP Kimura kyoozyu-ni yorimo] sakini] [IP sootyoo-ga Tanaka kyoozyu-ni  
Kimura professor-DAT than early dean-NOM Tanaka professor-DAT  
[QP sanninizyoo-no gaksuei]-o suisensaseta]] ra, rei-no kyoozyutati-ga hungaisuru  
three.more-GEN student-ACC made.recommend if the-GEN professors-NOM become.mad  
'If [IP [IP the dean made Prof. Tanaka recommend [QP three or more students]]  
[AdvP earlier [CP than Prof. Kimura]]], the professors will be mad.'

The antecedent clause of the CE in (i) has the configuration of [NP-NOM [<sup>l</sup>NP-DAT [QP-ACC Verb]] CAUSE]. Since the <sup>l</sup>NP and the QP are the subject and the object in the causative clause, we can safely assume that the former asymmetrically c-commands the latter. The CE in (i) gives rise to the Adv>QP reading, but not the QP>Adv reading, pointing to the conclusion that the generalization in (11a) can be maintained while that in (12a) cannot.

Furthermore, the CE in (ii), a scrambled counterpart of the CE in (i), allows the QP>Adv reading, further supporting the generalization in (11a).

- (ii) [IP [AdvP [CP Kimura kyoozyu-ni yorimo] sakini] [IP sootyoo-ga [QP sanninizyoo-no  
Kimura professor-DAT than early dean-NOM three.more-GEN  
gaksuei]-o Tanaka kyoozyu-ni suisensaseta]] ra, rei-no kyoozyutati-ga  
student-ACC Tanaka professor-DAT made.recommend if the-GEN professors-NOM  
hungaisuru.  
become.mad  
'If [IP [IP the dean made Prof. Tanaka recommend [QP three or more students]] [AdvP  
earlier [CP than Prof. Kimura]]], the professors will be mad.'

tween an NP and a QP, the discussions in this section constitute evidence for the relevant hypothesis.

#### 4. Additional Remarks

I have demonstrated above that the isomorphism principle holds between an NP and a QP through the scope interaction between a QP and the AdvP in a CE. As noted in Section 1, the effects of the isomorphism principle cannot be observed through the investigation of the scope interaction between two QPs in the ‘regular’ contexts. One may reasonably wonder why the effects can be seen in the former but not in the latter.

As mentioned in section 1, it is argued in Hayashishita (1999), (2000ab), and (2003) that while the surface scope can be generated directly from the grammar, the inverse scope cannot. It is also maintained in Hayashishita (2003) that the extra-grammatical operation that is responsible for the inverse scope (and possibly for the surface scope) can operate in a clause only if all of its major constituents are in A-positions. Given that the isomorphism principle concerns grammatical operation, it is expected that its effects may be obscured by the extra-grammatical operation in general. Such an operation, however, cannot operate in a CE, for the locus NP of the antecedent clause must be in an A'-position (see Section 2). Hence, the effects of the principle are observed in a CE.

Finally, I would like to make a remark on the nature of the isomorphism principle itself. Although I have argued for the isomorphism principle above, this principle is difficult to state in terms of theoretical primitives. In the general framework of the minimalist program (cf. Chomsky 1995), for example, covert movement is stated in terms of Copy and Merge. Thus, the incorporation into the grammar of this principle as it is stated requires us to put constraints on these primitive operations. It would therefore be desirable to derive its effects of this principle independently, and I intend to do so in a separate work.

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